CLINICAL PROCEEDINGS

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CHILDREN'S HOSPITAL

WASHINGTON, D. C.

December 1953

VOLUME IX NUMBER 12

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CLINICAL PROCEEDINGS

OF THE CHILDREN'S HOSPITAL

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This bulletin is printed for the benefit of the present and former members of the Attending and Resident Staffs, and the clinical clerks of Georgetown and George Washington Universities.

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EDITORIAL

Happy birthday! It is with considerable pride that the editors of the Clinical Proceedings recognize the tenth anniversary of this Journal. This issue marks the beginning of the tenth year of publication and we are grateful for the continuing acceptance and increasing interest demonstrated by subscribers and house officers alike in these efforts. The late Dr. Joseph S. Wall in his foreword published in the first issue in December 1944 stated that the first article of the constitution of the Children's Hospital which was adopted in 1870 included the following three objectives of the Institution.

1. Medical and surgical treatment of sick children.
2. Instruction in the diseases of children.
3. Instruction of young women in the duties of nursing.

This early recognition and designation of teaching as a function almost co-equal with the treatment of sick children has characterized the work of our hospital from its very inception up to the present day.

It would be well therefore again to review on the occasion of this tenth anniversary, the purposes that gave birth to the idea of publishing some of the conferences, case presentations and other interesting teaching material that are presented weekly at the Children's Hospital. First, as a teaching technic for residents and medical students, detailed case reports with a review of the current literature have proven to be a time-tested and good method of making abstract knowledge more concrete. It is much easier to remember details of therapy when associated with a given case. Second, isolated cases of a somewhat rare disease entity are brought into the literature whereas they might otherwise be buried in the hospital files and never brought to light while waiting for three or four more cases of the same entity to be grouped together in a more detailed review of the entity. Third, internes and residents are presented with an opportunity to develop an art of writing which it is hoped will be continued as they progress in their careers. Fourth, an attempt has been made by the editors to offer an opportunity to the hospital staff to present to its readers significant knowledge in the form of an interesting case report without the stress on pedantric writing which makes a number of medical journals rather boring reading for many subscribers whose interests may be largely clinical.

It is to be emphasized that the Clinical Proceedings is a resident physician effort designed to contribute to their learning and teaching of medical students. In this role it has generally succeeded to the considerable benefit of the two hundred medical students from Georgetown and George Washington Universities who receive their pediatric training at the Children's Hospital every year.

The enthusiasm of the house officers and the students has been a constant source of stimulation to the staff editors as has been its countrywide acceptance by it subscribers. According to the records from our subscription book, in March 1945 the paid circulation was in the range of 500 to 600. In 1948, the number of subscriptions went over the 1000 mark and despite the necessity of raising the subscription fee last year, the paid subscriptions this year have reached the 2,000 mark. In addition 360 complimentary copies of each issue are sent to medical school libraries in this country and abroad. Among the latter are nearly all of the Latin American countries, Canada, England, France, Holland, India, Italy, Japan, Spain, Sweden, and Switzerland.

The editors of the Clinical Proceedings are most grateful for the splendid cooperation of the entire staff and in particular to its subscribers for the many favorable comments and constructive criticism that have been received over the past ten years.

Frederic G. Burke, M.D.
Managing Editor

THROMBOCYTOPENIC PURPURA IN TWINS

Anthony De Spirito, M.D.

The simultaneous occurrence of thrombocytopenic purpura in twins is sufficiently rare as to warrant the reporting of the illnesses of two patients.

CASE PRESENTATIONS

R. H.,* 21 months of age, the first of the twins, was admitted on August 28, 1953 because of bleeding from both ears and the nose. The present illness began on the day prior to admission at which time the woman caring for the children noted blood in both ear canals and some peculiar red spots and bruises on the child's skin. The following day the patient's mother was called and at that time bleeding from the nose and a number of hemorrhagic spots were noted on the body. The child was taken to the hospital immediately.

His twin brother, M. H.,* was seen at the hospital while visiting his brother on August 29 and a small ecchymotic area over the forehead was noted. The child was not examined at that time. Two days later the grandparents, with whom the child was now staying, noted a red rash and the child was immediately brought to the hospital.

Past history reveals that R. H. weighed 6 pounds 5 ounces at birth and his twin, M., weighed 6 pounds 13 ounces. They lived with their mother until they were five months of age. From that time until admission to Children's Hospital they had been in three foster homes. The mother was usually able to visit the children at weekly

* On the ward service of Dr. Milton Greenberg.

intervals. For the two months prior to admission the two children lived in a suburban Maryland home. We were able to visit the home through the aid of social service and found a young couple whom it is felt were adequate and able to care properly for the children. We are also satisfied that the history is correct and so far as is known there has been no preceding infection and/or ingestion of toxins and drugs. The father is at present in military service and has been separated from the mother for 15 months.

Physical examination on the admission of R. H. revealed a 21-month old white male with blood in the ear canals and bleeding from the nose. Many ecchymotic and petechial areas were seen over the body. The drums were not visualized, the tonsils were hemorrhagic and all mucous membranes were seen to have petechiae. The chest was clear and examination of the abdomen was essentially negative. The liver was barely palpable and the spleen was not felt.

The original platelet count was under 10,000, the bleeding time 40 minutes, and the performance of a Rumpel-Leede test yielded many petechiae over the entire arm. The child was immediately given cortisone, sedatives, antibiotics and vitamin K. Bone marrow examination one day after admission revealed a normal marrow.

Despite almost constant transfusions and the insertion of post-nasal packings, the child continued to be in a precarious state. Bleeding from the nose was almost continuous. The tonsils and tongue were hemorrhagic and the child passed many soft, tarry stools. New petechiae were constantly appearing and on the morning of September 1, the fourth hospital day, dry rales were heard at both bases posteriorly for the first time. The following morning the post-nasal packs were removed because of difficulty in respiration. Hematocrit, hemoglobin and platelet determinations were done several times daily and fluctuated a great deal (see Fig. 2). In the first five hospital days the patient received 2500 ml. of blood, some of which was freshly collected blood in plastic containers.

FIG. 1. R. H. before splenectomy.

On September 2 at 6 p.m., five days after the patient's admission, a splenectomy was performed under spinal anesthesia. Surgery was uneventful, but twelve hours later, respirations became labored, retraction of the interspaces was noted, and a tracheotomy was necessary. During the five days post-operatively the child required

DATE	HB.	HEMATOCRIT	BT	CT	PLATELETS
8–29 a.m.	9.1	26%			10,000
8–29 p.m.	6.3	21%			6,300
8–30	8.5	28%			6,300
8–31	5.4	17%			10,200
9–1 a.m.	11.5	33%			10,200
9–1 p.m.	5.5	18%			10,200
		Operation			
9–2	10.5	37%			10,200
9–3	7.0	24%			10,000
9–4	10.8				10,000
9–5	8.8	27%			10,000
9–7	10.8	36%			75,000
9–9	17.5	54%			20,000
9–10			1′3″	3′	
9–11	18.0				225,000
9–12	16.5	57%			200,000

FIG. 2.

FIG. 3. M. H. at time of low platelet count.

about 650 ml. of blood. Within 24 hours the bleeding had greatly diminished and the last transfusion was given on September 5, the eighth hospital day. Marked erythroid hyperplasia and possibly a slight reduction in the number of megakarocytes was revealed by bone marrow examination done two days post-operatively. It will be noted that the platelet count did not rise until five days post-operatively and reached normal four days later (see Fig. 2). The child was discharged on October 3, 1953 to a convalescent home to be followed in the blood dyscrasia clinic.

On admission the twin brother, M., had several ecchymotic areas on the forehead and extremities with a generalized purpuric rash over the body. The physical examination was otherwise negative. On admission the blood count was within normal range except for the absence of platelets on the peripheral smear and a total platelet count of 10,000. Bleeding time, clotting time and a Rumpel-Leede test were normal. The child had a nose bleed when he fell from his chair while eating his first meal in

DATE	HB.	HEMATOCRIT	BT.	CT.	PLATELETS
8-31	11.7	38%	3'0"	3'30"	10,000
9-1	10.5	32%			25,000
9-3	9.0	33%			20,000
9-5	11.0	35%			50,000
9-7	12.0	35%			90,000
9-9	11.4	37%			80,000
9-11	13.0		45"	2'40"	50,000
9-21					225,000
9-24					300,000

FIG. 4.

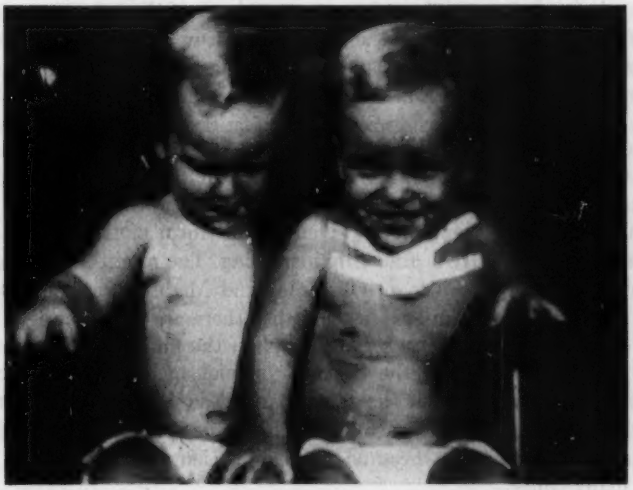

FIG. 5. M. H. and R. H. together following splenectomy on R. H.

the hospital. This hemorrhage was controlled without much difficulty. Bone marrow examination on September 1, one day after admission, revealed a normal marrow. It will be seen from Figure 4 that the platelet count rose spontaneously to between 50,000 and 80,000 without any therapy. On September 12, 13 days after admission, he was placed on ACTH and cortisone which was continued for 16 days. The platelet count returned to normal on September 21 and remained there. The child was discharged on October 12, to be followed in the clinic.

DISCUSSION

E. Clarence Rice, M.D.

The occurrence of thrombocytopenic purpura in siblings and their parents has been noted by many observers and we have seen similar hematologic abnormalities in patients at the Children's Hospital. Wintrobe reports that in 13 out of 62 of his patients with thrombocytopenic purpura, a family history was obtained. This is the first time that we have seen thrombocytopenic purpura in twins.

In the patients at Children's Hospital with thrombocytopenic purpura the most common etiologic factors are infections, most often viral, such as chicken pox and measles, allergies, drug sensitization, and hematologic disorders caused by the replacement of the normal bone marrow elements, such as seen in leukemia. Hypersplenism is sometimes a cause. Excluding the patients with leukemia, the cause of thrombocytopenic purpura is more likely to go undiscovered than to be determined. In the two patients, whose cases have been reported, the question arises as to whether we are dealing with an hereditary factor or if this is due to an infection. No history of infection or fever was obtained and no evidence of thrombocytopenia was found in the mother. The father's blood was unobtainable. There is no known history of bleeding or bruising in the relatives of the patients. Regardless of the lack of a history of infection, it would seem possible that these boys could have had a mild virus infection which caused the almost simultaneous appearance of the purpura. An hereditary factor may have been operating at the same time and the two factors may have caused the thrombocytopenic purpura.

While the term, idiopathic, is given to this form of thrombocytopenic purpura, our knowledge is gradually increasing. The recent report made by Stefanini, Chatterjea, Plitman, Dameshek and Mednicoff at the American Association of Blood Banks indicating that there are four groups of blood platelets and six types, may serve to explain the finding of thrombocytopenia in the newborn on the basis of platelet incompatibility between mother and baby, in much the same manner as Rh incompatibility has been demonstrated. Platelet incompatibility may explain the gradual failure of transfusions to benefit thrombocytopenic patients who have been transfused many times.

Inasmuch as there is usually a normal or increased number of megakaryocytes in the bone marrow of patients with idiopathic thrombocytopenic purpura (ITP), the spleen has been suspected as producing a platelet inhibiting factor and it is known that it does destroy thrombocytes. Antibodies have been demonstrated in the plasma of patients with ITP, which will cause platelet agglutination. Such agglutinins are rarely found in the blood of patients with the acute form of this disease and are more likely to be demonstrated in the chronic form. Blood plasma from a patient with ITP given in a normal person may cause reduction in the number of platelets and changes in the morphology of the megakaryocytes of the recipient. It is likely that the capillary fragility is related to the functions of the spleen and the adrenal.

Since the use of steroid therapy in the treatment of capillary fragility due to thrombocytopenia, the plan of treatment has changed considerably because of our increased ability to control hemorrhage. We can often afford to wait three or four months, if necessary, during the administration of ACTH or cortisone, to determine if the patient will have a remission and avoid the hurried and sometimes unnecessary removal of the spleen. By using siliconized and plastic equipment an increased number of platelets can be transfused as compared with the conventional equipment. There appears to be no correlation between the effect of steroid therapy on the platelet count and capillary fragility and the benefits which will be obtained from splenectomy. It is our feeling that patients with ITP, who are considered to be suitable candidates for splenectomy, and have surgery done, get along better in later life than those who are not operated on. Pediatricians and surgeons should realize that the removal of the spleen in a young child may render such an individual more susceptible to infection. The list of children who have acquired fulminating infections, involving the meninges particularly, serves to give warning that the beneficial effects as related to the megakaryocytes and platelets, must be weighed against the loss of immunity and the increased susceptibility to infection.

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THE USE OF ACTH AND CORTISONE IN THE NEPHROTIC SYNDROME IN CHILDREN*

Fernando R. Leyva, M.D.†,
Muriel Sowers, M.D.

This paper is based on a total of 51 courses of ACTH and cortisone administered to 20 patients with the nephrotic syndrome, of which 15 were classified as pure or uncomplicated lipoid nephrosis and five were of the mixed type, i.e., nephrotic syndrome of chronic glomerulonephritis.

Those classified as uncomplicated lipoid nephrosis were characterized by anasarca, proteinuria, hypoproteinemia, hypoalbuminemia, hyperlipemia, and by the absence of hematuria, hypertension and azotemia. The mixed type were usually patients in which some nephritic component was obviously present for more than 10 months in the course of the disease. We realize the difficulties in the differentiation of cases of lipoid nephrosis from the nephrotic syndrome of chronic glomerulonephritis. However, the clinical picture and the natural course of the former are so distinctive that they merit a clinical separation until the etiology and pathogenesis of the disease is clarified.

The majority of the patients in this study were observed for several days before any attempt at treatment was made. This period of observation is particularly important because of the possibility of occurrence of spontaneous diuresis which often coincides or follows acute infections of bacterial or viral origin.

The following laboratory procedures were done before, during and after treatment: urinalysis, hemogram, total eosinophile count, sedimentation rate, total serum proteins and ratio, cholesterol, nonprotein nitrogen, sodium, potassium, chlorides, and throat cultures. The urinary formaldehydogenic corticoids and the 17-ketosteroids were not determined in this series.

The patients were routinely weighed. Fluid intake and output were measured when possible. The blood pressure was determined twice daily.

The therapeutic measures instituted consisted of a diet free of salt and rich in proteins with limited fluid intake. Potassium chloride, 1–2 gms. daily, was given by mouth at the onset of the diuresis. Antibiotics were administered prophylactically during and after the hormonal treatment, sometimes up to 12 consecutive months. In a few cases, concentrated salt-free-serum albumin was used following the induced diuresis, when the urinary protein leakage was at a minimum. The ACTH was administered in

* Read at the Seventh International Congress in Pediatrics, at Habana, Cuba; October 15, 1953.

† Pediatrician, USPHS Outpatient Clinic, Washington, D. C. from the Departments of Medicine and Laboratories, Children's Hospital.

TABLE I

Uncomplicated Lipoid Nephrosis

AGE	ONSET OF ILLNESS	SPONTANEOUS DIURESIS	COURSES OF ACTH	INDUCED DIURESIS	DURATION OF REMISSION
4—S. B.	Jan. 50	2	3	3	5 weeks
8—P. B.	Jan. 51	0	3	3	20 mo.
5—M. M.	July 50	2	4	4	21 mo.
5—W. G.	Sept. 50	2	8	4	died
10—D. M.	Jan. 51	1	1	1	8 mo.
6—C. B.	Nov. 50	1	2	2	active
3—J. M.	Aug. 51	2	3	1	died
6—W. B.	April 50	1	2	1	active
2—J. O. D.	Jan. 52	0	1	1	15 mo.
6—M. C. C.	Jan. 52	0	1	1	8 mo.
3—E. W.	June 52	0	4	4	active
6—R. S.	Sept. 52	0	3	3	active
5—I. M. C. D.	May 52	0	2	2	active
6—A. B.	Dec. 51	0	1	1	9 mo.
3—O. D.	Nov. 52	0	2	2	active
Total (15 cases)		11	40	33 = 83%	

TABLE II

Nephrotic Stage of Chronic Glomerulonephritis

AGE	DATE OF ONSET	SPONTANEOUS DIURESIS	COURSES ACTH	INDUCED DIURESIS	DURATION OF REMISSION
7 years—S. Y.	July 49	2	5	4	active
2 years—E. K.	Dec. 52	0	2	2	active
6 years—K. F.	Nov. 48	4	1	0	died
8 years—J. C.	Nov. 47	1	1	0	died
4 years—C. R.	Nov. 49	1	2	0	died
Total (5 cases)		8	11	6 = 55%	

short courses from 8 to 12 days with a dose ranging between 40 to 80 milligrams per day, in divided intramuscular doses every eight hours. Cortisone was used in doses from 25 to 100 milligrams daily in periods of four to six weeks. A few patients were treated with cortisone up to six consecutive months.

Tables I and II present a concise summary of the types of cases studied, showing the age, onset of illness, number of previous spontaneous diureses, number of treatments, percentage of induced diureses and finally, the present condition of the patient.

The results of this study can be briefly summarized in the following four principal phases:

A. The Diuresis: Hormone-induced diuresis with nearly total loss of edema was obtained in approximately 80 per cent of 40 courses in 15 patients with uncomplicated lipoid nephrosis and in 55 per cent of 11 courses in 5 patients with the nephrotic stage of chronic glomerulonephritis. The overall incidence of diuresis in the two groups was 76 per cent, or 39 of 51 courses of hormone therapy This hormone-induced diuresis is similar clinically and biochemically to the diuresis which occurs spontaneously in the course of the disease. This improvement is reflected in the loss of edema with increased excretion of sodium, disappearance of the proteinuria and restoration toward normal of the hyperlipemia and serum proteins.

B. The Remission: Following an induced diuresis three events may occur:
   1. A rapid reaccumulation of fluid within two weeks.
   2. A transitory remission of variable duration (from 3 to 12 months) which is followed by recurrence of edema, albuminuria, etc. Most of our cases belong to this group.
   3. A prolonged remission and recovery (?). Only three cases remained in remission for more than 15 months in our series.

C. The complications during hormone administration are:
   1. *Metabolic disturbances:* Potential hypochloremic alkalosis and tetany (one case). A low salt syndrome may develop following a profuse diuresis and the low dietary salt intake. An early transient elevation of blood urea is frequently seen with the hormonal administration.
   2. *Endocrine disturbances:* Signs of hyperadrenocorticism were minimal in our series, probably because of the short courses of hormone given.
   3. *Cardiovascular disturbances:* Tachycardia and transient elevation of the blood pressure may occur.
   4. *Infections:* There is a definite lowered resistance to and masking of the signs of infections. Antibiotics should be used concurrently with the hormones.

D. The Follow-up: The management of infections remains the most common and most important problem in children with the nephrotic syndrome. The incidence of infections is closely related to the number of recurrences of the disease and with the intensification of the edema. It is highly desirable that antibiotics be given prophylactically or intermittently at the first sign of infection. Finally, a well regulated diet rich in proteins, vitamins and minerals, and low in salt (0.5 grams daily) if faithfully adhered to, will keep the majority of the patients free of edema although the disease remains fairly active as shown by the persistent albuminuria and hypoproteinemia.

E. In conclusion, ACTH and cortisone represent the most effective drugs for the production of diuresis in patients with the nephrotic syndrome. Following the diuresis the majority of patients will continue to have active disease. Here the use of adequate diet and antibiotics will help keep them free from recurrence of the edema. At the present time it must be doubted that the ultimate course of the disease can be altered by the use of these hormones.

CLINICO-PATHOLOGICAL CONFERENCE

MONDAY, OCTOBER 19, 1953

Directed by: E. Clarence Rice, M.D.
Assisted by: W. Luther Hall, M.D.
By Invitation: Roy Klepser, M.D.

This three-year-old white boy was admitted to Children's Hospital complaining of pain in the left anterior chest of three days' duration. He had been well all of his life but his mother thought that he had been somewhat anorexic during the preceding six weeks. Three days prior to admission, he began to complain of dull, aching pain in the left upper anterior chest. He had no cough nor evidence of an upper respiratory infection.

The past history was non-contributory.

The family history revealed that the father has cystic disease of the lungs.

Physical examination revealed a well developed, well-nourished white male infant who did not appear ill. His temperature was 101°F on admission. Examination of the lungs revealed dullness to percussion over the left upper chest both anteriorally and posteriorally with absence of breath sounds in these areas. There was a palpable mass in the right upper quadrant of the abdomen which was smooth, rounded, nontender and fixed.

Laboratory procedures revealed complete blood count and urinalysis to be within normal limits. Chest X-ray revealed an opacity throughout the left lung field with a suggestion of a mass in the left upper lobe. A thoracentesis was productive of a moderate amount of thin, blood-tinged fluid which showed no growth on culture and was negative for malignant cells. Repeat X-ray of the chest after thoracentesis disclosed a solitary grape-fruit sized, mass in the left upper chest. A flat film of the abdomen and an intravenous pyelogram demonstrated the left kidney to be normal and the right kidney to be displaced laterally with compression and distortion of the pelvis and calyces.

Six days after admission a laparotomy was performed. The left kidney, liver and abdominal lymph nodes were normal. A soft cystic, multiloculated mass about the size of one's fist, involved the right kidney. The entire tumor mass and right kidney were resected.

Seven days after admission, the day following nephrectomy, a left thoracotomy was performed. A grape-fruit sized, solid tumor mass filled most of the left chest and compressed the lower lobe. The tumor was smooth and completely covered by compressed but otherwise normal pulmonary tissue. The mediastinal lymph nodes were

not enlarged. A small amount of blood-tinged fluid was present in the pulmonary cavity. A left upper lobectomy was performed, after which the lower lobe expanded well once the compressing tumor was removed. During the closure of the chest wall, the anesthetist announced that the heart had suddenly stopped beating; the chest was reopened at once and the heart was found to be cyanotic and not beating. Cardiac massage was immediately instituted and, without the aid of stimulants, normal rhythm was resumed. He was discharged, afebrile and asymptomatic, two weeks after admission.

X-ray therapy was instituted, a total dose of 3200 r over the anterior and posterior left chest being given.

At home he gained weight; his appetite was good, and he was able to resume normal physical activity. Follow-up X-rays of the chest at monthly intervals were normal until five and one-half months after operation, when a small solitary shadow appeared in the midportion of the left lower lobe. Six months after the left upper lobectomy, an extrapleural left lower lobectomy and pleurectomy were performed. Following this operation the patient's clinical course was rapidly downhill with the development of a left empyema and destructive bone lesions in the thoracic vertebrae, scapula and femur. The empyema was drained under local anesthesia, but the patient's condition continued to deteriorate, respiratory distress became severe and he expired seven months after his first admission to the hospital.

DISCUSSION

Roy G. Klepser, M.D.

In establishing a differential diagnosis from this protocol we can make several assumptions. First, we are dealing with a malignant disease characterized by several pulmonary and skeletal metastases and a fatal outcome in spite of surgery and irradiation.

Second, we might assume that the abdominal operative findings were such as to indicate a need for haste in removing the thoracic tumor. It is, of course, possible that the renal tumor was benign, in which case the chest would be operated upon as soon as practical but hardly on the following day unless a hypernephroid type of tumor had been encountered. The speed with which the second operation followed the first would indicate need for eradicating all of the diseased tissues at once. Had a benign cystic kidney been found, for example, the lung lesion might justifiably be thought to be another cyst, and the second operation would have followed after a more reasonable interval.

A third assumption might be that the intrapulmonary tumor was a metastatic rather than a primary tumor arising in the lung. A lobectomy was done, removing all of the tumor tissue seen or felt. The rapid and sudden appearance of a second lung metastasis after roentgen irradiation indicates the highly malignant nature of the tumor. The remaining lower lobe of the lung was removed extrapleurally, presumably because of pleural involvement or to prevent unnecessary trauma to the mass, again indicating the surgeon's respect for its ability to spread. The development of

empyema was due to the downhill course of the child and probably has no relationship to the type of tumor removed.

Because of the short time interval with which the thoracotomy followed the nephrectomy I believe that the kidney lesion was highly malignant. I do not believe that the kidney operation is a "red herring." We would not ordinarily consider doing a lobectomy or pneumonectomy on the day following a nephrectomy unless there were reason enough to justify the added risk.

This would probably mean that this was a Wilms' tumor or hypernephroma. The age of the child, the rapidity with which the tumors attained fairly large size, and its fatal course seem to bear this out. Wilms' tumors, or embryonal adenosarcomas, do sometimes metastasize to the lungs in this manner, but such a course is not common.

We must also consider papillary "clear cell" carcinoma of the kidney, as these are bulky tumors which often metastasize to the lung. Such tumors, however, are usually characterized by a single slow-growing metastasis, and removal of the kidney and the solitary metastatic lesion often gives a fair chance of eradicating the disease. Carcinoma of the kidney is often more locally invasive and hemorrhagic than this kidney has been described, and is a more solid type of tumor.

The appearance of the second pulmonary tumor justified its removal by lobectomy if no other metastatic disease was apparent at that time. Doing a pneumonectomy at the first thoracotomy would not have altered the picture, for the metastatic lesion might just as well have appeared in the opposite lung, in which case it would not have been removable if a left pneumonectomy had been done previously. Complete skeletal x-rays at the time of the second thoracotomy might have disclosed some bony metastases, however, which would have eliminated the second lobectomy, as the child was already hopelessly unsalvageable at that time.

PATHOLOGICAL DISCUSSION

Dr. W. Luther Hall: The students' diagnoses are as follows: Three are in favor of a Wilms' tumor with metastases; three believe it to be a neuroblastoma with metastases, and there are single votes for cystic disease of the lung, medulloblastoma, Ewing's sarcoma and tuberculosis.

Dr. Klepser, your clinical impressions in this case were precisely the same as those of the attending physicians.

After surgical removal, the right kidney weighed 264 grams and measured 9 x 7.5 x 7 cm. Grossly and microscopically the kidney is composed of varying sized cysts, fewer in number but greater in size, than usually seen in a polycystic kidney.

The specimen from the second operation consisted of a round mass

weighing 400 grams and measuring 10 cm. in diameter. The external surface was smooth, glistening and dark red. On cut section, soft crepitant pulmonary tissue was found at the periphery of the tumor. The periphery of the tumor was moderately firm and cut with normal resistance, the tumor tissue bulging from the cut edge. Whorls of irregular, amorphous tumor occupied the center of the tumor and the color varied from grayish-white to dark red to bright yellow. Microscopically, the tumor is composed of mesodermal derivatives which have overgrown the other elements and the stroma is definitely malignant. Some of the sections show islands of embryonic cartilage, but most of the tissue consists of undifferentiated cells with numerous mitoses. Most of the cells have pale, almost indistinguishable cytoplasm and large, vesicular nuclei with rounded ends. Large areas of necrosis, with associated hemorrhage, are present. The tumor is very vascular and the vessels are lined by normal endothelium.

The left lower lobe was removed at the third operation and grossly there were innumerable metastatic lesions, varying from 1 to 3 cm. in diameter, which have the same microscopic picture as that described above.

The positive autopsy findings are as follows: the body was that of a normally developed, poorly nourished three year old white male. There was a drainage tube just below the left scapula in the left posterior axillary line through which purulent brownish material was draining.

The pericardium was markedly thickened, and yellowish-white, and was adherent to the myocardium and to the pleura of the left pleural cavity. The parietal pleura on the left was markedly thickened, yellowish-white and contained numerous white nodules varying in size from 0.25–1.5 cm. in diameter. There was 30 ml. of yellow-brown purulent material in the left pleural cavity. The pleural surface of the entire right lung was studded with numerous white nodules averaging 1.5 cm. On section, the lung parenchyma was dark red and crepitant. No demonstrable superfluous masses were present except for a few which seemed to bulge into the parenchyma from the pleura.

There was a mass in the left upper quadrant which was believed to be retroperitoneal. It lay below and lateral to the stomach and medial and inferior to the spleen. Part of the transverse colon and the splenic flexure were adherent to its antero-inferior surface and the tail of the pancreas was adherent to its antero-superior surface. The mass weighed 380 grams and measured 12.5 x 8.5 x 8.5 cm. It was dark reddish-brown, round and firm. On opening the mass, the superior portion contains bulging, firm whorls of white tissue which cut with ease and measured approximately 4 cm. in diameter. The inferior and lateral portions contained clotted blood and the tissue was dark red, friable and soft.

There was an increase in fibrous tissue around the lower pole of the left adrenal. Its gross architecture was not altered.

Microscopic examination of the retroperitoneal tumor reveals its architecture to be similar to that seen in the large metastatic lesion in the left upper lobe. There were metastatic lesions in the right lung and pleura, left adrenal, pancreas and bone.

The final pathological diagnoses were:

1. Retroperitoneal malignant teratoma, with metastases to both lungs, right pleura, left adrenal, pancreas and bone.
2. Empyema, left pleural cavity.
3. Chronic pericarditis and left pleuritis.
4. Post polycystic right kidney.
5. Interstitial pneumonia, right lung.

The primary pathology is that of a highly malignant tumor which it is believed originated as a retroperitoneal teratoma and spread via the blood stream to form a large metastatic tumor in the left lung, a few metastases in the right lung and the left adrenal. The involvement of the right pleura was probably due to lymphatic spread and the tumor infiltrated by direct extension into the tail of the pancreas. The sequelae of a left pneumonectomy was the development of a chronic pleuritis and finally empyema which was subsequently drained. It is believed that the polycystic kidney was a separate entity and unrelated to the tumor formation or the metastases.

Dr. Rice: Inasmuch as a polycystic kidney and a teratoma both represent abnormalities of development, I would consider that there might be some relationship in the etiology of these two disturbances of development.

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